Forces and Motion

8-5 The student will demonstrate an understanding of the effects of forces on the motion of an object. (Physical Science)

8-5.2 Use the formula for average speed, *v=d/t,* to solve real world problems.
Taxonomy level: 3.2-B Apply Conceptual Knowledge

Previous/Future knowledge: Students have been introduced to the concept of speed and direction in 3rd grade (3-5.2) and to position, speed, and direction in 5th grade (5-5.2). Students have not been introduced to the concept of average speed or calculating speed using the formula, *v=d/t* in previous grades. Students will further develop the concepts of using motion formulas to solve problems in high school Physical Science (PS-5.2).

It is essential for students to know that average speed can be calculated by dividing the total distance the object travels by the total amount of time it takes to travel that distance.

- While the speed of the object may vary during the total time it is moving, the average speed is the result of the *total distance* divided by the *total time* taken.
- Speed measurements contain a unit of distance divided by a unit of time. Examples of units of speed might include "meters per second" (m/s), "kilometers per hour" (km/h), or "miles per hour" (mph or mi/hr).
- Average speed can be calculated using the formula v=d/t where the variables are:
  - ***v*** is the average speed of the object
  - ***d*** is the total distance or length of the path of the object
  - ***t*** is the total time taken to cover the path

NOTE TO TEACHER: Students need to recall the formula v=d/t and use the formula to calculate problems involving average speed.

It is not essential for students to know that velocity is the speed in a given direction or that acceleration is the rate of change in velocity. Students do not need to solve problems for time or distance.

Assessment Guidelines:
The objective of this indicator is to *use* the formula for average speed to solve real-world problems*;* therefore, the primary focus of assessment should be to solve problems using the formula v=d/t. However, appropriate assessments should require students to *identify* the variables involved in solving problems related to speed; *recognize* appropriate units for representing average speed; or *recall* the formula for average speed.